Application No.: 09/682,443
Amendment in response to office action mailed May 17, 2004

REMARKS/ARGUMENTS

Reconsideration and re-examination are hereby requested.

The Examiner has objected to paragraph 0014 on page 4 as being an incomplete sentence. According to applicant's records, such sentence states:

"FIG 1 is a graph showing the relationship between NOx conversion efficiency and the multiplier factor f2 as a function of temperature for a green catalyst;"

The objection is not understood.

Claims 1, 4 and 12 stand rejected as being anticipated by Bagley et al (U. S. Patent No. 5,497,617).

Claim 1 points out that the method includes:

> injecting the hydrocarbon into the engine exhaust in accordance with detection of a light-off event, such light-off event being detected when there is a hydrocarbon-oxygen reaction wherein an exothermic reaction is produced and detected. (emphasis ours)

Bagley et al., do not detect an exotherm; rather Bagley et al, create an exotherm;

Claim 4 points out that the method includes:

> (a) detecting an exothermic reaction across the catalyst;
> (b) detecting a temperature of the catalyst in response to the detected exothermic reaction; and
> (c) injecting the hydrocarbon into the reaction in accordance with the detected temperature.

Claim 12 points out that the method includes:

> (a) detecting an exothermic reaction across the catalyst;
> (b) measuring a temperature of the catalyst in response to the detected exothermic reaction; and
> (c) injecting the hydrocarbon into the reaction in accordance with the measured temperature.

Bagley et al., do not:

> (a) detect an exotherm; rather Bagley et al, create an exotherm;

(b) measure or detect a temperature in response to a detected exotherm since they do not detect an exotherm; or

(c) adjust or inject in accordance with the temperature detected or measured in response to a detected exotherm since they do not detect an exotherm.

Claims 4-19 stand rejected as being anticipated by Hirota et al,

The Examiner correctly indicated that in Hirota et al., the temperature t2 (lower case t) is a measured temperature. However, the temperature T2 (capital T) is ***not*** a measured temperature. The temperature t2, i.e., the measured temperature of Hirota et al., is not measured in response to the detected exothermic reaction. ***Thus, Hirota et al., do NOT inject a hydrocarbon into the reaction in accordance with the measured temperature of an output of the catalyst in response to detection of exothermic reaction.*** To put this still another way, with Hirota et al., hydrocarbon injection is not based upon the ***measured temperature of the catalyst*** *when* an ***exothermic reaction is detected***.

The diagram below is representative of a portion of applicant's method and system:

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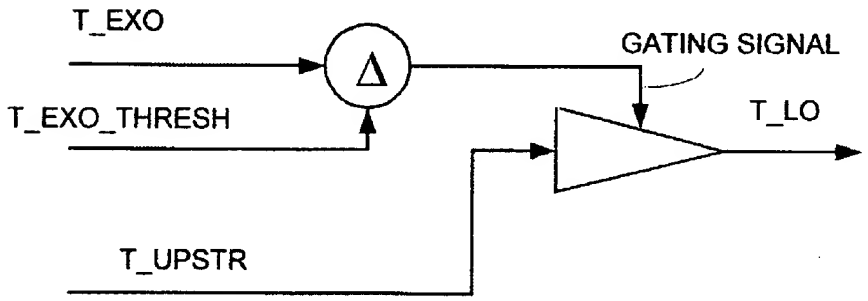
INVENTION

T_EXO_THRESHOLD is a reference temperature

T_UPSTREAM is a temperature at the output of the catalyst

T_LO is the MEASURED temperature value of T_UPSTR when T_EXO exceeds T_EXO_TRESH and therefore T_LO is a MEASURED temperature



Note that an exothermic reaction across the catalyst is detected (i.e., when T_EXO exceeds T_EXO_THRESH) is detected and the temperature of an output of the catalyst (T_UPSTR) is ***measured*** (i.e, the temperature T_LO is the ***measured*** temperature at the output of the catalyst ***when T_EXO exceeds T_EXO_THRESH)***. Hydrocarbon is injected into the reaction in accordance with the ***measured temperature*** (T_LO)

The diagram below is a representation of the system and method of Hirota et al.

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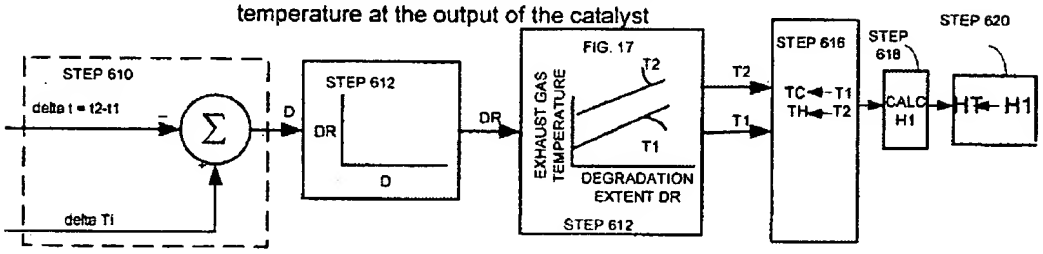
HIROTA ET AL.

t1 and t2 are measured temperatures and thus delta t is the difference between two measured temperatures

T2 is the upper limit of a temperature RANGE, it is NOT a measured temperature at the output of the catalyst



As noted above, t2 is a measured temperature and T2 is ***NOT*** a measured temperature. Clearly, Hirota et al., do NOT measure a temperature of an output of the catalyst in response to "the detected exothermic reaction". Thus, Hirota et al. do NOT inject the hydrocarbon into the reaction in accordance with the ***"measured"*** temperature as set forth in claim 12.

Thus, Hirota et al., do NOT inject a hydrocarbon into the reaction in accordance with the measured temperature of an output of the catalyst ***in response*** to ***detection*** of exothermic reaction. To put this still another way, with Hirota et al., hydrocarbon injection is not based upon the ***measured temperture of the catalyst WHEN*** an ***exothermic reaction is detected (i.e., in response to detection of)***.

Considering the claims:

Claim 4 points out that the method includes detecting a temperature of the catalyst in response to the detected exothermic reaction; and injecting the hydrocarbon into the reaction in accordance with the detected temperature. (emphasis added)

Claim 5 points out that the method includes determining an exothermic condition temperature upstream of the catalyst when the temperature difference is determined to exceed the threshold and comparing the determined exothermic condition temperature with an exothermic condition temperature expected from the catalyst at a time prior to the determined exothermic condition temperature.

Claim 6 points out that the method includes: (a) detecting a pair of temperatures across the catalyst, such pair of temperatures providing a temperature difference across the catalyst; (b) comparing the temperature difference with a predetermined temperature threshold; and (c) determining an exothermic condition temperature when the temperature difference is determined to exceed the threshold, such exothermic condition temperature being determined from one of the pair of detected temperatures.

Claim 7 points out that the system includes a processor for controlling the hydrocarbon injector in response to the pair of sensors, such processor being programmed to:

determine an exothermic condition temperature from one of the pair of sensors when the difference in the common parameter is determined to exceed the threshold;

compare the determined exothermic condition temperature with an exothermic condition expected from the catalyst at a time prior to the determined exothermic condition temperature; and

compare a difference in the common parameter detected by the pair of sensors with a predetermined threshold;

Claim 9 points out that the system includes a processor being programmed to:

provide a control signal to a hydrocarbon injector to inject the hydrocarbon into the exhaust upstream in response to output signal from a pair of sensors, each of the pair of sensors being adapted detecting a common parameter in the exhaust, one of such sensors being upstream of the catalyst and the other one of the sensors being downstream of the first sensor, such control signal being provided by steps comprising:

comparing a difference in the common parameter detected by the pair of sensors with a predetermined threshold;

determining an exothermic condition temperature from one of the pair of sensors when the difference in the common parameter is determined to exceed the threshold;

comparing the determined exothermic condition temperature with an exothermic condition expected from the catalyst at a time prior to the determined exothermic condition temperature; and

modifying the injected hydrocarbon in accordance with said last-mentioned comparing.

Claim 10 points out that the method includes comparing a difference in a common parameter detected by a pair of sensors with a predetermined threshold, one of such sensors being upstream of the catalyst and the other one of the sensors being downstream of the first sensor; determining an exothermic condition temperature from at least one of the pair of sensors when the difference in the common parameter is determined to exceed the threshold; comparing the determined exothermic condition temperature with an exothermic condition expected from the catalyst at a time prior to the determined exothermic condition temperature; and modifying the injected hydrocarbon in accordance with said last-mentioned comparison.

Claim 12 points out that the method includes (a) detecting an exothermic reaction across the catalyst; (b) measuring a temperature of the catalyst in response to the detected exothermic reaction; and (c) injecting the hydrocarbon into the reaction in accordance with the measured temperature.

Claim 13 points out that the method includes (a) detecting a pair of temperatures across the catalyst, such pair of temperatures providing a temperature difference across the catalyst; (b) comparing the temperature difference with a predetermined temperature threshold; and (c) determining a temperature of the catalyst when the temperature difference is determined to exceed the threshold, such determined temperature being obtained from at least one of the detected temperatures.

With regard to new claims 20 and 21:

Bagley et al., do not disclosure of using a detected light-off temperature to determine anything related to catalyst ageing. As such, it is simply not relevant.

Hirota et al., do not disclose identifying the light-off temperature as the temperature

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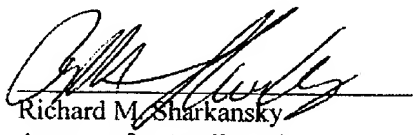
at which an exothermic reaction is detected, and then using that determined light-off temperature to adjust reductant injection.

In the event a petition for extension of time is required by this paper and not otherwise provided, such petition is hereby made and authorization is provided herewith to charge deposit account 06-1510. If there are insufficient funds in this account, please charge the fees to Deposit Account No. 06-1505.

In the event any additional fee is required, please charge such amount to Patent and Trademark Office Deposit Account No. 06-1510. If there are insufficient funds in this account, please charge the fees to Deposit Account No. 06-1505.

Respectfully submitted,

8-17-04
Date



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